NOTES AND LITERATURE

NOTES ON ICHTHYOLOGY

An elaborate and excellent monograph is the "Ichthyologia Amurensis," by Dr. Leo S. Berg, being a "Catalogue of the Fishes of the Amur River," entirely modern in its method, and very accurate in its details. Unfortunately, most of this admirable volume is in Russian, without résumé in any modern language. It is published by the Imperial Academy of Sciences at St. Petersburg, volume 24.

Professor T. D. A. Cockerell, of the University of Colorado, continues his very interesting and fruitful studies of the scales of fishes. In the *Proceedings of the Biological Society of Washington* (1910), he discusses the scales of the Cyprinoid and Clupeoid fishes. He shows that the American genera related to *Chondrostoma* are but two in number, *Orthodon* and *Acrocheilus*. The scales of the American species are less primitive than those of the old-world *Chondrostoma*.

In the study of the scales of *Leuciscus* and *Rutilus*, Professor Cockerell shows that none of the American species belong to either of these two genera, and none of them to the genus *Phoxinus*. For the American species called *Leuciscus*, the name *Richardsonius* of Girard should be adopted; and for the American species called *Phoxinus* the new subgeneric name *Margariscus* is suggested. The name *Myloleucus* of Cope is properly adopted for the American species hitherto called *Rutilus*. A new subgenus, *Temeculina*, is proposed for *Richardsonius orcutti*. The Japanese species called *Leuciscus* are not related to the European species, but approach more nearly to the American forms, perhaps entering the genus *Richardsonius*. Mr. Cockerell shows that the genus *Notemigonus* is well separated from the European genera *Abramis* and *Blicca*.

The scales of the herring-like fishes are also discussed. These show relatively simple and primitive structure.

The scales of the Atherinoid fishes show qualities more or less like those of the mackerels. In other papers published in the *Smithsonian Miscellaneous Collections*, volume 56, Mr. Cockerell discusses the scales of the African Mormyrid fishes and of the African Characins.

In the *Proceedings of the Royal Society of Victoria* (1909), Miss Ethel R. Morris and Miss Janet Raff discuss the structure of the little lancelet of the coast of Victoria, which they call *Asymmetron bassanum*. The generic name *Epigonichthys* of Peters has priority.

In the *Journal of the Royal Society of New South Wales,* Vol. XLI, Mr. H. C. Dannevig, of the Department of Fisheries, discusses the effects of the coastal winds of Australia on the abundance of fish in inshore waters. He shows that the relative abundance of many species in different places is due to the nature of the winds.

In the *Annals of the Carnegie Museum,* Volume V, Dr. Charles R. Eastman describes a new fossil shark, *Helodus comptus,* from Meadville, Pa.

In the *Annals and Magazine of Natural History,* Series 8, Vol. 4, Mr. C. Tate Regan describes a number of new species of fishes, mostly eels, from the South Seas and Australia.

In the same journal, Mr. Regan discusses the three-spined sticklebacks of the world. He finds those of the Atlantic coasts of Europe and America and those of the Pacific coast alike, including all the species of three-spined sticklebacks hitherto described under the name of *Gastrosteus aculeatus,* with the exception of *G. algeriensis,* which has a smaller number of vertebræ, 29 instead of 31 to 33. He also describes a species with a slender snout, from Rome, under the name of *Gastrosteus hologymnus,* and a new species, *Gastrosteus santæ-annæ,* from the Santa Ana River in California. This he regards as distinct from the naked specimens of *Gastrosteus* hitherto known as *G. williamsoni,* by the presence of 29 instead of 32 vertebræ. The specific distinction of *G. santæ-annæ* is very doubtful, but Mr. Regan is doubtless correct in saying that mailed, half-mailed and naked forms in Europe and America are the same species, those living in the sea being fully mailed, those living in fresh water mostly naked.

In the same *Annals,* Mr. Regan discusses the caudal fin of *Elops* and of other fishes. He finds the tail of *Elops* distinctly heterocercal, like that of some of the fossil forms of earlier periods. He also shows that the tail of *Fierasfer* is not gephyrocercal. In its general structure, it is like that of related forms, but the caudal fin has disappeared.

In the *Proceedings of the Zoological Society of London* for

1909, Mr. Regan discusses in detail the family of Anabantidæ.

In the *Archives de Zoologie Experimentale,* fifth series, volume 1 (1909), Dr. Louis Fage discusses in great detail the variations in the red surmullet of Europe. He finds that *Mullus surmuletus* is a form of *Mullus barbatus* somewhat less developed, so that the two species can not be maintained as distinct. If one is to give the right value to the variants of the surmullet, it is necessary to have not only a trinomial but a quadrinomial system of naming.

In the *Bulletin de la Société Philomathique,* 1909, Dr. Jacques Pellegrin discusses the minute catfish of the genus *Vandellia.*

In the *Proceedings* of the Seventh International Zoological Congress, Mr. Regan discusses the origin of the Chimæroid fishes. He regards them as derived from the same stock as the sharks, but more primitive.

In the said *Proceedings,* Mr. Regan discusses very fully the classification of the Teleostean fishes. It will be a long time before any satisfactory grouping of these animals can be made, but every analysis of this sort shows the importance of the problem, and the soundness of the American view, that a complete analysis of these forms must be made before any satisfactory synthesis is possible. To place groups together simply because we don't know how to separate them, does not form a classification of any permanence. A new order, Malacichthyes, is made for the genus *Icosteus,* and another order, Chondrobrachii, for *Podateles.* On the whole, this classification shows several points of advancement over any previously proposed, but there is plenty of room for doubt in regard to many of the adjustments.

In the "Scientific Investigations of the Fishes of Ireland," Volume 4, E. W. L. Holt and L. W. Byrne discuss the *Chimæras* of the Irish coast. These are three in number, *C. monstrosa, C. affinis* and *C. mirabilis. C. plumbea* and *C. abbreviata* are identical with *C. affinis.* A new species of *Rhinochimæra, R. atlantica,* is described. Of this genus, only a single Japanese species is hitherto known.

In the *Quarterly Journal of Microscopical Science,* volume 54 (1910), Professor J. Graham Kerr describes the development of the alimentary canal in *Lepidosiren* and *Protopterus.*

In the *Publications of the Department of State,* the International Fisheries Commission (David Starr Jordan and Edward Ernest Prince) have published the regulations, sixty-six in num-

ber, by which it is proposed to control the fisheries of the international boundary waters.

In the *Proceedings of the United States National Museum,* Dr. Jordan and William Francis Thompson describe a new species of deep-water sculpin, *Triglopsis ontariensis,* from Lake Ontario. The Lake Michigan form related to this, long since named *Triglopsis stimpsoni,* is also described and figured.

In the same *Proceedings,* Frank Walter Weymouth, of Stanford University, describes a collection of fishes from Cameron, Louisiana. One species, *Leptocerdale longipinnis,* is described as new. The three related species of this family, Cerdalidæ, are known from the west coast of Mexico.

In the "Smithsonian Report" for 1908, Dr. Theodore Gill discusses the variant forms of angler fishes, with figures of many species. He shows that the name *Lophiodes,* Goode and Bean, "Oceanic Ichthyology," p. 537, has priority over the name *Chirolophius.*

In the *Proceedings of the Portland Society of Natural History,* Vol. II, William Converse Kendall gives a list of the fishes of Labrador, as collected by the Bowdoin College Expedition of 1891. A check list of the species of Labrador contains seventy-three names.

In the *Bulletin of the Illinois State Laboratory of Natural History,* Professor Stephen A. Forbes gives a series of maps, showing the distribution of the fishes of Illinois in the streams of the state. The distribution of these fishes reflects, as Professor Forbes says, in uniformity and relative monotony, the features of the topography of the state.

In the *Philippine Journal of Science,* Vol. IV (1909), Mr. Alvin Seale describes a large number of new species of fishes from the Philippines, in addition to those named in the check list of Jordan and Richardson, published at about the same time in the same journal. Mr. Seale has had opportunities for making studies of the Philippine species such as have fallen to no other ichthyologist.

In the *Bulletin of the Bureau of Fisheries,* Vol. 28, are the proceedings of the Fourth International Fisheries Congress, held at Washington in September, 1908. Upwards of thirty papers bearing on fisheries are contained in this series, covering in some degree almost every matter of interest to fish culturists.

Notable among these papers is one by Dr. Theodore Gill, on a

plea for exact observation of the habits of fishes as against undue generalization.

Mr. L. F. Ayson discusses the introduction of American fishes into New Zealand, an operation which has been thoroughly successful. Most notable is the growth of the rainbow trout in the lakes of the northern island. Anglers are restricted to thirty pounds a day, and over twenty tons of trout have been taken out of two small lakes at Rotorua in one season. The rainbow trout is frequently taken from ten to twenty pounds or more in weight.

Mr. G. M. Dannevig discussess the success of the Norwegians in the planting of the fry of codfish in depleted waters.

Three papers, by S. W. Downing, Frank N. Clark and Paul Reighard, on the promotion of whitefish production in the Great Lakes, are especially important and suggestive. It is shown that with the adequate planting of whitefish eggs it would be possible practically to capture all the adult fish, and the natural spawning of the fish could be made a matter of no importance. This discussion looks forward to the time when the fishing season for whitefish will be largely identical with the spawning season; that is, in November, when the eggs of each fish thus caught will be preserved and hatched, and the young fish placed in the open water of the lakes. The whitefish ground is greater in Lake Erie than in any other of our American lakes. The plant of whitefish fry in Lake Erie now approaches one billion young fish per year, and, in spite of the enormous fishing taking place in that lake, the number of whitefish is increasing.

The following are the special recommendations of Mr. Reighard, and these should receive the most careful consideration from those interested:

1. It is recommended, as a result of the foregoing study, that the output of whitefish fry be increased as rapidly as possible, as affording the most certain means of increasing the whitefish production.

2. That an intensive plant of at least one hundred fry per pound of whitefish caught be made on depleted areas. (Lake Ontario and the southern waters of Lake Michigan are in need of especial attention.)

3. That a close season be observed during the breeding season of the whitefish as at present, but only for such waters as are not under federal control.

4. That commercial fishing with pound nets and seines be permitted in the waters of the Great Lakes during the breeding season of the whitefish wherever the state or national authorities are prepared to undertake to care for the spawn of the fish taken; the fisherman to be under legal obligation to permit the use of the fish taken by them for the purpose of spawn-taking.

5. It is suggested that central control of the fishing operations of the Great Lakes is highly desirable. Whether this is possible in American waters through federal control or through concerted action of the states is a question that can not be discussed here. A central control, under which fishing grounds should be leased and fishermen licensed, would, if properly administered, reduce the cost of fishing and make possible more extended artificial propagation. The central authorities should have power to modify the fishing regulations pending legislative action. Such a system might be made self-supporting.

6. The need of more exact knowledge of the habits of the whitefish and of all the conditions under which it lives is very evident. In the interest of the fisheries these matters should be subjects of investigations to be carried on under federal auspices, with suitable equipment and for a long period of years.

In another paper, President Jordan discusses the work of the International Fisheries Commission, outlining the proposed operations of Great Britain and the United States. This commission at that time had just been appointed.

John I. Solomon discusses a process for preserving the pearl oyster fisheries, and increasing the value of the yield of pearls. To this important contribution was awarded the prize of $100, by the New York Academy of Sciences.

Professor Shinnosuke Matsubara, of the Imperial Fisheries Institute of Tokyo, discusses the variant forms of the goldfish developed by Japanese artist breeders. These are illustrated by colored plates.

Professor Jacob Reighard, of the University of Michigan, gives a most valuable account of the nests of the horned dace, and of the methods by which the habits of fresh-water fishes can be effectively studied.

DAVID STARR JORDAN.